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# (12) United States Patent

Watanabe et al.

# (54) VEHICLE ORIENTATION DETECTION METHOD AND VEHICLE ORIENTATION DETECTION APPARATUS

(71) Applicant: DENSO CORPORATION, Kariya,

Aichi-pref. (JP)

(72) Inventors: Yuusuke Watanabe, Anjo (JP); Yuya

Higuchi, Chiryu (JP)

(73) Assignee: **DENSO CORPORATION**, Kariya,

Aichi-pref. (JP)

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### (58) Field of Classification Search

### (56) References Cited

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Primary Examiner — Tyler Paige (74) Attorney, Agent, or Firm — Harness, Dickey & Pierce, P.L.C.

### (57) ABSTRACT

In this vehicle orientation detection method detecting the orientation of a vehicle on the basis of measurement data obtained at prescribed time intervals, as long as a speed sensed by a vehicle speed sensor is less than a threshold speed, the vehicle orientation is detected on the basis of a yaw rate sensed by a yaw rate sensor. If the speed detected by the vehicle speed sensor is greater than or equal to the threshold speed, a drift determination is performed. If not determined to be in a drift state, the vehicle orientation is detected on the basis of signals received by a GPS receiver, and if determined to be in a drift state, the vehicle orientation is detected on the basis of the yaw rate sensed by the yaw rate sensor.

# 8 Claims, 8 Drawing Sheets

# START START START SPEED \( \alpha \) km/h OR HIGHER? S2 \( \text{YES} \) PERFORM DRIFT DETERMINATION PROCESS S3 \( \text{DRIFT STATE?} \) NO \( \text{S5} \) CALCULATE VEHICLE ORIENTATION FROM YAW RATE VALUE ORIENTATION FROM GPS SIGNAL S7 \( \text{CALCULATE VEHICLE ORIENTATION AFTER CORRECTION} \) S6 \( \text{PERFORM ORIENTATION ERROR CORRECTION PROCESS} \) S7 \( \text{CALCULATE VEHICLE ORIENTATION AFTER CORRECTION} \)